

Four-Day Gemini XII Is Program's Finale

NASA will conclude its Gemini manned space flight program with the four-day Gemini XII mission, from Cape Kennedy, Fla., no earlier than November 9.

Gemini XII, the tenth manned flight in the program, will include rendezvous and docking with the Agena in the third spacecraft revolution, docking practice plus 13 experiments.

A tethered station-keeping exercise is planned for the 12th flight to gain further notice of methods to save spacecraft maneuvering fuel while keeping two orbiting space vehicles close together.

Evaluation of the astronaut maneuvering unit (AMU) during extravehicular operations (EVA) has been deleted from the flight plan. Program officials feel these series of repetitive EVA work tasks now scheduled for the mission will contribute more to the understanding of man's capabilities outside the spacecraft than a test of the AMU.

The Gemini XII crew is James A. Lovell Jr., command pilot, and Edwin E. "Buzz" Aldrin Jr., pilot. Backup crew members are L. Gordon Cooper Jr. and Eugene A. Cernan.

Gemini XII will be launched at about 2:49 p.m. CST with the Agena target vehicle scheduled to lift some 98 minutes earlier at 1:11 pm CST.

After the third revolution rendezvous at 185 miles altitude, the Agena primary propulsion system (PPS) will be fired to place the docked vehicles into a 460 by 185 mile orbit. A second PPS maneuver in the 18th revo-

lution, after Aldrin's first extravehicular activity, will re-circularize the orbit at 185 miles.

The first EVA is planned for a two hour and 15 minute period, beginning about 20 and a half hours into the flight. Aldrin will stand in the open hatch and conduct a series of day and night photographic experiments.

The second extravehicular activity, about an hour and 45 minutes in duration, will begin about 43 hours into the mission. Aldrin will hook-up the Agena tether to the spacecraft docking bar and will carry out basic work tasks in the Agena target docking adapter area and in the spacecraft equipment adapter section.

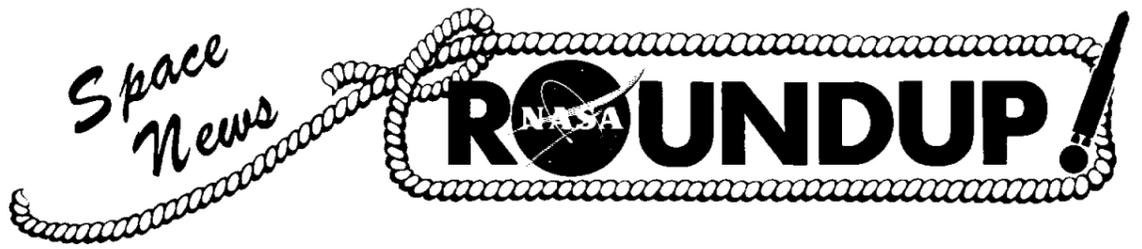
The tethered-vehicle station-keeping exercise will follow the second EVA and will last about six hours. Gravity gradient stabilization will be the primary techniques used during this period.

Retrofire will occur at about 94 hours into the flight. Gemini 12 will splash down in the West Atlantic some 94 hours and 30 minutes after liftoff.

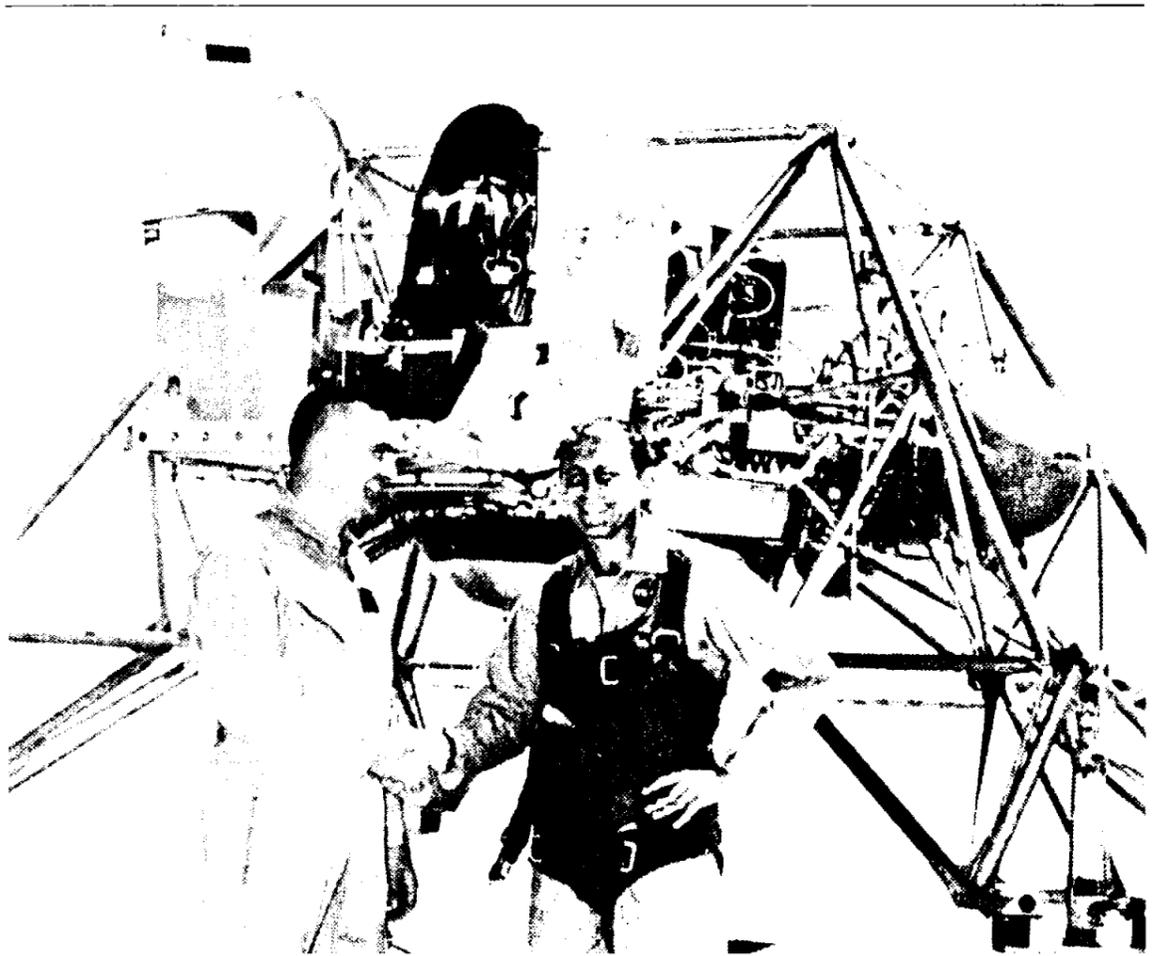
Gemini XII reentry will be controlled by the spacecraft on-board computer. The computer and inertial guidance system will feed reentry steering information into spacecraft thruster electronics in place of manual crew inputs. The crew will set up the reentry and monitor the flight director indicator during reentry periods. The crew will assume control only if the need arises.

The experiment schedule includes some Gemini standards.

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MSC CHIEF PILOT Joe Algranti is congratulated by Colonel Jack Kluever, NASA Flight Research Center, after completing checkout in the LLRV.

Weird Flying Machine:

Astronauts To Fly Lunar Landing Trainer Here in '67

Man's weirdest looking "flying machine", the Lunar Landing Research Vehicle (LLRV), will make its debut on the local scene late next month.

Apollo astronauts will begin to fly this wingless, free-flying platform, on or about February to develop landing skills needed when they reach the Moon. The LLRV and its follow-on cousin the Lunar Landing Training Vehicle (LLTV), will provide Apollo crewmen the closest thing to actual lunar flight characteristics engineering can devise.

Two of the LLRVs are scheduled to arrive at the Manned Spacecraft Center late in November. They are presently at NASA's Flight Research Center, Edwards California, where they are undergoing modifications and final checkouts before their shipment to NASA at Ellington Air Force Base.

LLRV No. 1 has been successfully flown nearly 200 times by Edwards and MSC pilots.

Fabricated of lightweight, tubular trusses, the LLRV resembles a playground "monkey gym" or a creation of cartoonist Rube Goldberg. It is wingless, stands 10 ft. high, is approximately 22 feet long and 13 feet wide.

A vertically mounted double gimballed fan-jet engine provides 4,200 lbs of thrust. Sixteen

attitude rockets for roll, pitch, and yaw control are mounted at each corner in clusters of four.

The pilot sits forward of the frame-like vehicle, much like the early pilot-ventures of the early 1900's. The LLTV will have an enclosed cockpit which will closely resemble the cockpit of the Lunar Module.

An electronic package, weighing approximately 140 pounds, is attached on the aft end of the vehicle. The LLRV weighs less than 4,000 lbs which includes 455 lbs of jet fuel and 689 lbs of 90 percent hydrogen-peroxide rocket fuel, similar to the fuel used on Mercury spacecraft.

Controlled throttling of the engine removes 5/6ths of the earth's gravitational pull. The craft using its rocket engine hovers, much like a helicopter, and the pilot can set the craft down in a vertical landing at speeds of 2 to 6 feet per second.

Test pilots at Edwards and MSC agree, without a doubt, that this strange looking craft provides the best simulation for lunar landing. The LLRV duplicates the last two minutes of lunar flight and can be piloted to a "very smooth landing."

MSC Chief pilot Joe Algranti, and fellow MSC pilot H. E. "Bud" Ream, who have completed checking out in the LLRV will be the instructor pilots for the Apollo astronauts.

Algranti said the LLRV provides the simulation for the most difficult portion of the lunar landing. "It will give the pilot some of the odd sensations he will feel on landing on the moon," the veteran NASA pilot said.

Prelaunch Tests Of Gemini XII, A/S 204 Begun

Joint combined systems tests of Gemini spacecraft XII and its launch vehicle began Monday at KSC Launch Complex 19. Other vehicles for the Gemini XII mission were also undergoing pre-launch tests: Agena rendezvous vehicle was in combined interface tests at Hangar E, and the Atlas Standard Launch Vehicle was in subsystem tests at Launch Complex 14.

In Apollo 204 preparations, Spacecraft 012 began altitude chamber tests at KSC in both manned and unmanned modes. Prime and backup crews for the first manned Apollo mission took part in the tests, each of which ran 10 hours. Decision on whether Apollo 204 will be manned is still pending.



LAST GEMINI CREW—Lacking recent newsphotos of Gemini XII preparations at Cape Kennedy, here is a posed publicity shot of the prime Gemini XII crew standing in a spacecraft cockpit. At left is pilot Edwin E. Aldrin, Jr., and at right is command pilot James A. Lovell, Jr.

125 years of Service



CXXV YEARS — Employees with a total of 125 years of Government service recently received service pins at RASPO Downey, California. Recipients of the awards were (L-R)—John W. Coburn, 10; E. R. Rogers, 25; D. L. Corbridge, 20; L. H. Peck, 20; Ella N. Pellerin, 25; R. H. Ridnour, Resident Manager, RASPO-Downey; and J. P. Hoffman, 25.

'BRINGS PROGRAM TO THEM'—

Blind Persons Get Apollo Story In Michoud's Braille Brochure

Blind persons, unable to use ordinary newspapers and magazines, have a new way of keeping track of US progress in space—a Braille brochure describing Project Apollo.

More than 500 persons have received the new brochure, "A Trip to the Moon in Project Apollo," and their reaction has been enthusiastic.

"We really appreciate it when someone takes time to Braille a pamphlet such as yours," said a recipient from San Angelo, Texas.

The Public Affairs Office of NASA's Michoud Assembly Facility in New Orleans has distributed the brochures to blind people in 37 states and 7 foreign countries.

Twenty-six of the letters requesting the booklet were in Braille. These were sent to the New Orleans Lighthouse for the Blind for written transcriptions.

The 26-page brochure explains in detail the United States' step-by-step program designed to place Americans on the moon and return them safely to earth before the end of the decade.

A division of the George C. Marshall Space Flight Center in Huntsville, Ala., Michoud is the production site of the giant Saturn V and Up-rated Saturn I first stages to be used in launching the Apollo spacecraft.

Michoud's program for the blind began with a telephone call from the New Orleans Lighthouse, requesting a tour of the mammoth plant for several blind persons.

The Lighthouse was advised that the 43-acre manufacturing building at Michoud and the size of the Saturn boosters being

assembled there simply did not lend themselves to blind inspection.

However, because of the interest in NASA's space programs, the Michoud Public Affairs Office offered to "bring the program to them" in the form of (1) presentations using actual scale models of the Saturn launch vehicles and (2) a brochure in Braille describing the planned manned flights.

More than 20 such presenta-

tions have since been given to blind audiences in New Orleans and Baton Rouge.

To aid the many not able to attend the presentations, the word of the Brailled brochure literally was passed around the world.

A West Bengal, India, professor, blind at birth, wrote he was interested in space projects and "please give the book a special packing for protection on transit across the globe."

Lewis Satellite Planned in Test Of Ion Engines

An orbital flight experiment designed to advance the development of ion engines as propulsion units for future long-duration space missions is planned in late 1968 by the National Aeronautics and Space Administration.

The NASA Office of Advanced Research and Technology has authorized the Lewis Research Center, Cleveland, to proceed with the second part of its SERT (Space Electric Rocket Test) Program. The first successful operation in space of an ion engine or electric thruster was conducted by Lewis in a 50-minute SERT I ballistic flight from Wallops Island July 20, 1964.

The program extension calls for a satellite mission to evaluate the in-flight performance of electron-bombardment ion engines over a period of six months or longer and to analyze the effects of thrusters and their electric fields on other components, such as solar cell arrays and radio transmitters and receivers.

Ion engines produce small amounts of thrust by ionizing and accelerating a propellant, such as Mercury, to velocities in excess of 100,000 MPH, but they can be operated for prolonged periods, or turned off and on at will for missions of very long duration.

Electric thruster applications range from single small units capable of controlling the attitude and orbits of satellites to potential multiple arrays able to provide the primary upper stage propulsion for manned or unmanned interplanetary missions.

Raymond J. Rulis is Project Manager of the SERT Program at Lewis.

In the SERT I flight, an ion engine built by Lewis was operated twice for a total of 30 minutes. SERT I confirmed in flight that positive ions racing out of the electron bombardment engine could be neutralized to achieve thrust.

Two ion engines designed and built by Lewis will be flown in SERT II. The characteristics of electron bombardment thrusters allow them to be scaled in power

Inside Rocket Tank



Astronaut Alan Bean inspects inside of hydrogen tank of Saturn S-IVB rocket stage on assembly line at Douglas Aircraft Company's Space Systems. Bean recently toured the Douglas plant as part of NASA's "Manned Flight Awareness" program. With Bean in this photograph is (L-R) Jack Delaney, NASA representative; and Douglas officials F. C. Runge and D. M. Green.

Gemini XII

(Continued from page 1)

such as synoptic terrain and synoptic weather photography, ion sensing, the frog egg experiment, and micrometeorite collection.

New to the program is the proposed viewing of a high-altitude sodium vapor cloud formed by the French Centaure rocket launched from Hammaguir, Algeria. The experiment, designated S-51, will take place about 64 hours into the flight.

The Gemini XII flight plan will be a change from the more leisurely but longer duration Gemini XII mission of Command Pilot Lovell. The 38-year-old Navy captain was pilot on that 14-day flight last December. He also was backup pilot on the Gemini IV mission and backup command pilot for Gemini IX.

Aldrin, a 36-year-old Air Force major with 66 combat missions over Korea to his credit, will be making his first space flight. He was backup pilot for Gemini IX.

The backup command pilot, Air Force Colonel Cooper, is a veteran of both Mercury and Gemini flights. He flew the MA-9 Mercury mission of May 15-16, 1963, a 34-hour 22-orbit flight concluding the Mercury program. He became the first man to make a second orbital flight when he commanded Gemini V during August 1965.

Cernan "space-walked" for more than two hours as the EVA pilot aboard Gemini IX, the three-day mission of June 3-6, 1966.

Lovell was named as one of the second group of NASA astronauts selected in September 1962. Aldrin and Cernan were selected with the third group in October 1963. Cooper was one of the original seven-man astronaut group of April 1959.

Gemini began April 8, 1964, with the four-day systems test flight test of the unmanned Gemini I. The second flight in the program, also unmanned, was a heat shield reentry test conducted January 19, 1965.

The first manned Gemini mission was a three-orbit flight by Virgil I. Grissom and John W. Young on March 23, 1965.

Since that flight the United States has logged 1,750 hours, 37 minutes and 28 seconds of man-hours in space. Including Mercury man-in-space figures, total time is more than 75 days. Eleven more astronauts have earned their flight wings in the Gemini program to date bringing the Gemini-Mercury total to seventeen.

The next program in the manned exploration of space is Apollo, designed to place two American astronauts on the moon and return them to Earth by 1970 and to gain for the United States preeminence in all aspects of manned space flight.

and size levels. Performance data from the 15 centimeter (nearly 6 inch) diameter engines, for example, will be applicable to engines more than three times as large.

Plans are to launch SERT II on a Thorad-Agena Rocket. The two ion engines, each with a power input of one kilowatt, will be attached to the Agena stage at its forward end. Only one at a time will be fired.

The Agena will serve as the basic spacecraft and will be stabilized in a nozzle-up position. It will be equipped with a 1½ kilowatt solar cell array.

The Agena and its components, including solar cells for electric power, constitute the flight equipment previously operated in space. The only spacecraft portion not previously flight-tested will be the new electric thrusters and their associated equipment.

The spacecraft will be integrated at Lewis for launch into a 575-mile polar orbit from the Western Test Range under the direction of Lewis Agena Project Office.

NETS—MSC to ERC

Long Range Computer Link NETS Time and Money

The first NASA inter-Center large-scale computer network, utilizing Government-owned computers, is operating between Massachusetts and Texas, providing solutions to complex spaceflight problems.

This first-of-a-kind data-link connects the Electronics Research Center (ERC), Cambridge, Massachusetts and the Manned Spacecraft Center (MSC), Houston, Texas. Established two months ago, this long-distance computer network is known as the NASA Experimental Terminal System (NETS). It provides computer service to electronic engineers at ERC in Cambridge, using the bank of large computers located in Bldg. 12 at the MSC in Houston.

ERC is one of five input terminals linked into NETS. The other terminals are located within several miles of the MSC.

NETS is operated by the Computation and Analysis Division at MSC in conjunction with its several users, one of whom is the Central Computation Branch at ERC. It is basically simple, despite the complex network of communication lines and computers which comprise the system.

When ERC's research engineers have a computer program, they read it into their input/output terminals at Cambridge. It is then transmitted over Western Union Communication land lines directly into a UNIVAC 418 communication processor, located on the second floor of MSC's Bldg. 12. The Cambridge

query is processed through the 418 and immediately fed into one of the three Houston computers—a UNIVAC 1106, an IBM 7044/7094 Direct-Coupled System, or a Control Data Corporation 3800.

This electronic transaction is virtually instantaneous. Once the ERC program passes through the UNIVAC communication processor, it is a matter of minutes until one of three computers begins processing it. The computer feeds the response back to the communication processor, which then relays the answers over the land lines to the ERC initiator in Cambridge.

NETS can handle multiple programs simultaneously. While ERC is transmitting programs to Texas, answers to previously submitted computer programs are being received. This provides extremely fast computation and decision-making capabilities to ERC researchers.

A typical problem being solved is the determination of the best trajectory for a flight to the planet Mars. Preliminary estimates and initial computations are transmitted to the Houston computers by ERC. The machines digest this material and optimize the possible trajectory still more, then return to Cambridge a more accurate space route which is then re-analyzed and further modified. The process may be repeated many times until certain primary requirements, such as the optimum weight of rocket fuel for each stage, are met.

NETS savings are in time and dollars. Valuable research time



TWO-WAY STREET—Linda Fiorenza of the NASA Electronics Research Center, Cambridge, Mass. prepares to transmit a computer program to MSC's Computation and Analysis Division computers in Building 12. The NASA Experimental Terminal System (NETS) is the first large-scale computer link between NASA centers, and speeds the exchange of technological information and computer services between ERC and MSC.

is saved when ERC electronics people feed their computer programs into NETS and in turn receive immediate answers. Without NETS, ERC researchers would depend upon rental computer time, on a first-come, first-serve basis, at higher costs and slower response.

Commercial computer time costs approximately \$600 an hour. NETS provides full-time

computer service at a fraction of this cost. An official of the MSC Computation and Analysis Division estimates ERC's savings at between 25-30% of commercial rates.

Each NETS program is written in the FORTRAN (FORmula TRANslation) computer language. It is then prepared for the computers along guidelines established in procedures manuals

prepared by the Theory and Analysis Office of the Computation and Analysis Division at MSC.

When NETS was initiated, Dr. Max Faget, Director for Engineering and Development, MSC, said "This, indeed, represents a significant step in computer technology and in improving the efficiency with which NASA utilizes its equipment."

Unwinding at the Annual MSC Picnic. Or was it Re-winding?

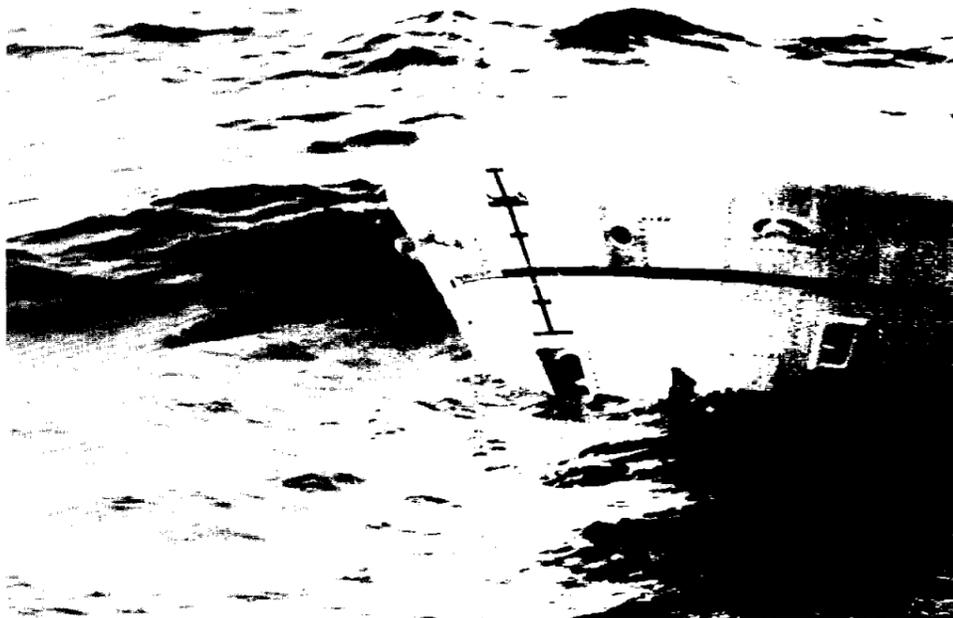


SHOOT-OUT AT CLEAR CREEK—Barbecue, suds and soda pop was the grub on the menu at the temporary MSC settlement in Galveston County Park October 1 as MSC employees and their offspring unwound for the annual Center Picnic. Boots and string ties were the dress of

the day as the picnic took on an Old-West motif, replete with saloon, wanted posters, stage-coach office, and Boot Hill.



ON STANDBY—Test subjects Louis DeWolf, Texas M. Ward and Harry Clancy wait for the go-ahead to ingress Apollo spacecraft 007, their home for the next 48 hours during operational postlanding sea trials in the Gulf of Mexico.



ADRIFT 48 HOURS—

Apollo Spacecraft Makes Go

Three somewhat weary but experienced Apollo sailors with visions of shaves, showers and steaks running through their heads October 2 climbed out of Apollo Spacecraft 007 after spending 48 hours drifting on rough seas in the Gulf of Mexico.

The first manned sea test of the Apollo command module seaworthiness and postlanding subsystems was termed "very satisfactory" by test engineers.

When MSC test subject Texas M. Ward, Louis DeWolf and Harry Clancy volunteered for the test mission, they did not know exactly what they would be in for. But when it was all over, they did agree it was a worthwhile experience. In addition to learning much about spacecraft subsystems while verifying the operational suitability of the Apollo command module during the postlanding phase of a mission, each test subject gained valuable experience which he plans to apply to his individual job area.

Ward, who heads the Apollo egress training program, found the test supplied him with knowledge that he can apply to Apollo egress training. A member of the Flight Crew Support Division since last December, Ward said that the Apollo command module makes a considerably better "boat" than the Gemini spacecraft. More stable in the water and with more comfortable crew

positions. "Apollo all in all is a pretty seaworthy craft," said Ward.

Also with FCSD since June, DeWolf said that he learned quite a bit about the Apollo spacecraft systems that he can apply to his job area of Apollo crew mission training.

Clancy, of the Landing and Recovery Division, described the 48-hour ride as quite an experience. He also will be able to apply his new knowledge to his spacecraft egress work in LRD. During the early part of the test Clancy had a mild case of *mal de mer*, but motion-sickness pills overcame his queasiness and he was feeling fine by the last day of the test. The other two test subjects also experienced brief periods of nausea.

Before joining MSC in January, Clancy for two years was a Peace Corpsman in Nigeria. He said that there was no comparison between his former job and riding 10 to 12-foot waves aboard an Apollo in the Gulf of Mexico.

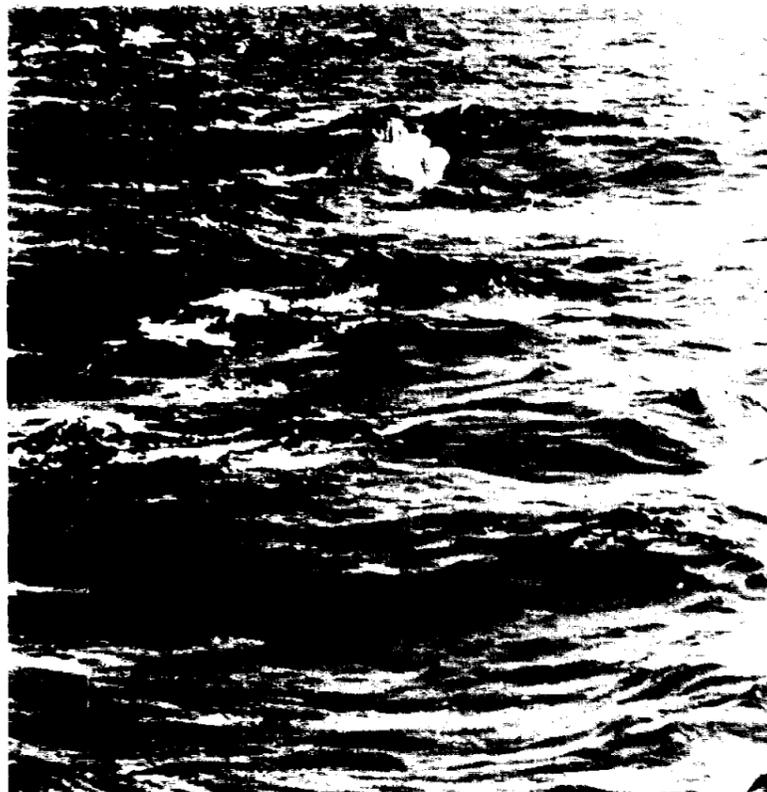
The actual beginning of the test had several delays because the seas were not rough enough. The requirement for 3 to 4 foot waves was met on Friday and somewhat exceeded later after the test was begun, when a weather front moved through the area and created wind waves of 10 to 12 feet.

At 4 pm. Friday, September 30, the test started by lowering the Apollo command module into the water from the NASA Motor Vessel *Retriever*.

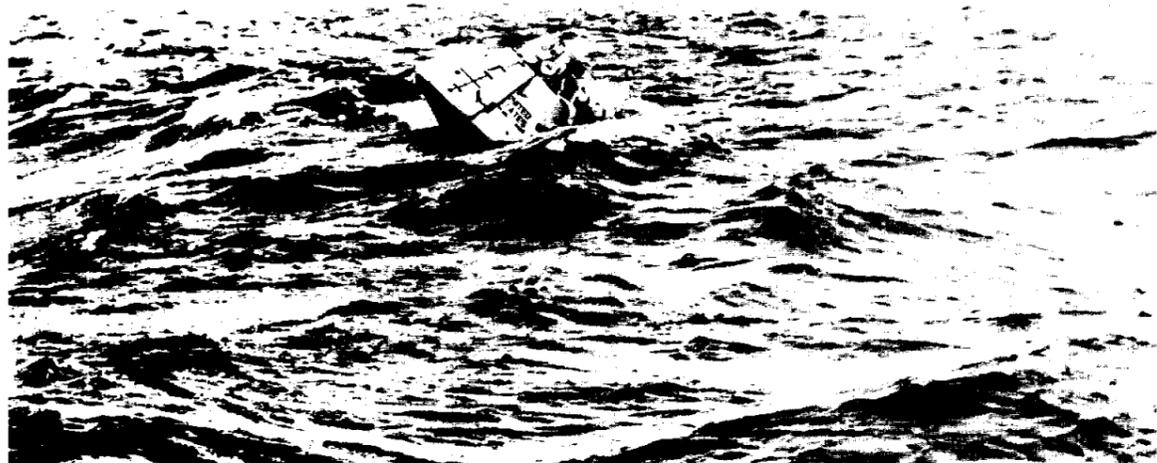
The test crew members were strapped in their couch when the spacecraft was lowered over the side by the large davit crane on the *Retriever*. By attaching another crane to a webbing around the heat shield base of the craft, the command module was literally flipped to a Stable-Two or apex down position. This position left the crew members suspended in the spacecraft from their harness.

Then almost immediately, two electric air compressors began to inflate three uprighting bags on the top deck of the Apollo command module and within six minutes the craft was back to a Stable-One or apex up position in the water. It remained in this position throughout the test, even in the high seas that were experienced when the weather front passed through the test area.

The test was begun 50 miles off the Galveston Island coast and during the course of the test the spacecraft drifted south for 24 hours, and then parallel to the shore line for the next 24 hours ending up 88 miles from the coast. During this period the *Retriever* followed the drifting Apollo command module and



IS IT FLIPPER?—The test crew aboard Apollo spacecraft 007 were not completely alone in the white-capped Gulf waters. In addition to the crew of the *Retriever* drifting near by, several porpoises cavorted happily around the strange new boat invading their domain.



TIME AND WAVES PASS—And the test continues. Before 48 hours were up, a frontal passage brought the wave height from the two or three feet shown at left up to 10 to 12 feet.

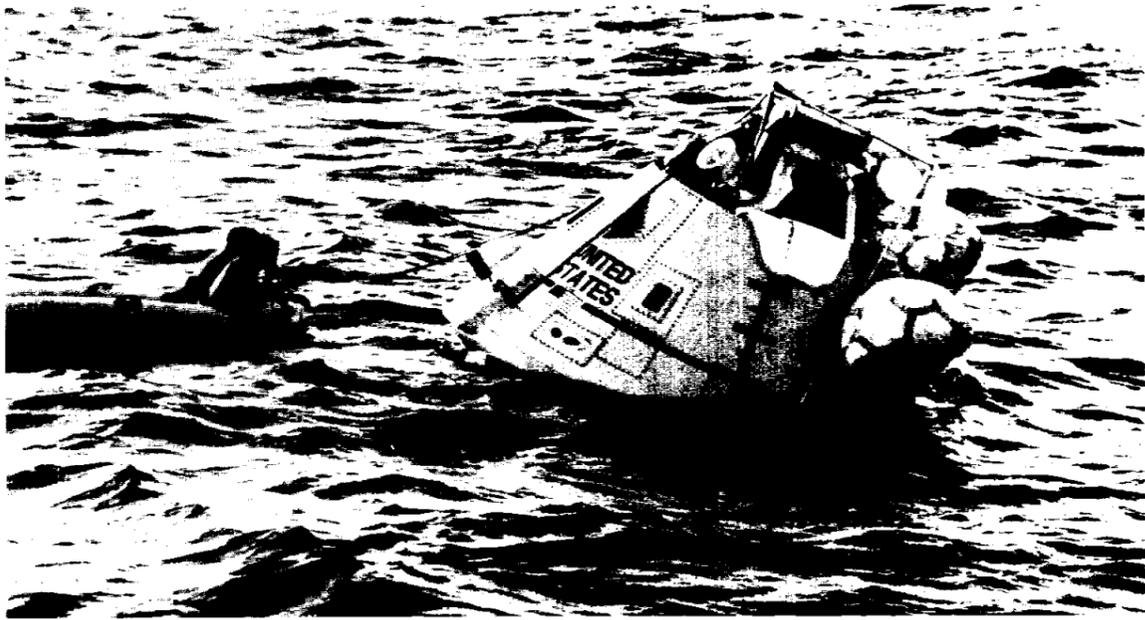
SUNDOWN AT SEA—Backlighting from the setting sun contrasts the Apollo spacecraft against the chrome-colored waves and the test crew begins to settle down for the night watch.



BOTTOMS UP—Spacecraft 007, with crew sealed in, was flipped to the apex down, or Stable 2 position in a test of the Apollo uprighting system, left.



YES SIR, YES SIR, THREE BAGS FULL—Three uprighting bags in the spacecraft's recovery compartment inflated and righted the spacecraft to the apex-up, or Stable 1 position, in six minutes.



Good 'Boat' in Sea Trials

maintained constant visual and voice contact.

Jim Shannon and Larry Bell from Landing and Recovery Division's Operational Evaluation and Test Branch, were the test conductors and they along with other people on board the *Retriever* manned positions around the clock during the test.

A large instrumentation van was loaded onto the aft deck of the *Retriever* for the test, and two shifts were utilized to man the equipment that monitored the various systems in the Apollo spacecraft.

Manning the shifts in the van were Shannon, John Fairchild of Crew Systems Division, J. C. Blaylock, a physiologist with the Environmental Medicine Branch and Ken Roden from Lockheed on the first shift, and Bell, Dr. John R. Hubbard of EMB, and William R. Chase and Donald G. Morris of LRD, on the second shift.

Voice contact was made every hour on the hour with the test crew and one man was always on watch at night while the other two tried to sleep. Comments from the crew indicated they were anxious to complete the test but were still willing to go all the way with the test.

Other comments by the test crew included a reference to getting "quite a ride" when the

spacecraft was flipped to the Stable-Two position, and during the portion of the test when the seas were high, their man comment from inside the spacecraft was that they were "just hanging on!" The crew did not use any of the strap or harness restraints except during the first portion of the test and when the spacecraft was hoisted aboard the *Retriever* after completion of the test.

Shortly after the test started on Friday, the crew activated the post landing ventilation system, removed their flight suits and proceeded with the erection of the HF antenna. A failure occurred with this antenna within minutes after it was erected and the VHF antenna was utilized for communications during the test.

The crew then settled into a housekeeping mode and made preparations for the night. None slept much Friday night because of the rough seas, but all three said they slept five to six hours Saturday night.

Sunday the crew took air flow measurements inside the cabin and performed a salt water conversion procedure for making potable water from sea water. Other than these chores and regular housekeeping, the crew spent most of their time "hanging on" in the rough seas during the test.

Others taking part in the exercise included Frank Gammon, the captain of the *Retriever*, Frank Janoch, ship's engineer and Bill Lyons, ship's seaman. Also supporting the test were swimmers Lamar Beatty, Art Lizza and James Bailey, along with Bill Johnson, crane operator, and Sonnie Porter, rigger—all from the Technical Services Division. An assist in the operation of the *Retriever* was also part of the duties of the Tech Services people during the test.

Also aboard the *Retriever* during the test were Austin Frost, quality control engineer from the MSC Flight Safety Office; C. Mac Jones, project engineer for the 007 Spacecraft from LRD; and Dick Benjamin, North American Aviation representative.

When the test was completed Sunday evening the spacecraft test crew got their wish for a shave, shower and steak. When they emerged from the command module, they looked and felt good but offered a suggestion to have the person that entered the spacecraft crew station to wear a gas mask.

Later that evening the test subjects were returned to Freeport aboard one of Humble's crew boats that operated between the oil rigs in the Gulf area waters.



STOWAWAY—Mr. Pogo Possum, a seagoing marsupial who stowed away on the *Retriever*, was adopted by the ship's crew as the unofficial mascot. Holding Pogo up for inspection are Lamar Beatty and Bill Johnson of Technical Services Division. Pogo jumped ship and disappeared when the *Retriever* docked at Galveston Coast Guard Station at completion of the sea trials.

STEAK BREAK—The 48-hour test over, a weary test crew prepares to dig into steaks and baked potatoes in the *Retriever's* galley. Left to right are Ward, ship's cook Harry Brazzel, Clancy and DeWolf.



OUT OF TEXAS' PAST—

San Jacinto Cannons Still Lost After Man's Exhaustive Search

About this time every year Charley Mitchell used to make a pilgrimage to Houston from his ranch on Carancahua Bay, to continue his lifelong search for the Twin Sisters, the lost Cincinnati cannons that the Texas forces used so effectively in the Battle of San Jacinto.

Charley's wife, Mary, often came with him. The first time I accompanied them on a field trip he was in his 80s and she in her 70s. Charley then had been on the cannons' cold trail for almost half a century.

Every year Charley would repeat his offer of a \$500 reward for information leading to recovery of the lost fieldpieces.

The search usually began at the site of the old G. H. & H. railroad station in Harrisburg. It was there on a summer's night in 1865, Charley said, that four ex-Confederate GIs stole the San Jacinto guns from the Yankee occupation forces and hid them too well.

Said the rancher: "Henry Graves, John Barnett, Ira Pruitt and Sol Thomas got off a train here and saw the Twin Sisters waiting to be shipped North for scrapiron. According to a letter written by Henry—which I own—they saw the nameplates on the gun carriages. The plates said the pieces were made by Greenwood and Webb, in Cin-

cinnati, and were presented to the people of Texas by the ladies of Cincinnati.

"So they rolled the guns 'down to the bayou a mile and a half from the depot,' burned the wooden parts, threw the metal fittings into the stream and buried the barrels three feet deep on a ridge under some pines, 300 or 400 yards from the bayou, near the home of a Dr. Valentine."

"Which bayou?" I once asked Charley. "Buffalo or Bray's?"

"Henry was a stranger in Harrisburg," he said. "I don't think he knew one bayou from another."

At one time the cannon hunter believed that Henry had meant Bray's. So he petitioned the mayor for permission to make an excavation in Mason Park. Charley told me he received "a real mean letter from some fellow at city hall telling me in no uncertain terms they didn't want any holes dug in Mason Park."

Later on Charley decided that Henry's "bayou" was really Plum Creek. But property owners along the creek didn't want any holes dug on their land either.

One October I visited the Mitchells at their ranch. Charley and I sat on the front gallery of the big old house six miles south of LaWard, down in the country where the French explorer LaSalle built Fort St. Louis in 1685. A southeast gale was banging the shutters on the windows of the room upstairs where my host had been born more than 80 years before. And through the rattling leaves of two giant palms we could see the whitecaps sparkling on Carancahua Bay.

Charley, who was an energetic and sometimes iconoclastic historian, owned an oil painting (which hung in the room where he had been born) showing Francis G. Keller, the original grantee of this league, negotiat-

ing a peace treaty with a council of Kronk Indians. And it always irked Charley that most historians picture the Kronks as wild, cruel cannibals.

"They were like any other Indians," he told me as we sat on the gallery. "They had mean ones, and good ones. But the name Carancahua doesn't refer to a specific tribe. The word means *Waders in Water* and was used to describe all the coastal tribes from the Sabine to the Rio Grande. Frank Keller wrote that he was treated fine during that treaty smoke and that the Kronks always kept the treaty."

The old rancher then told me a remarkable story about the invention of condensed milk, a process universally credited to the genius of Gail Borden, of Galveston. Charley insisted that the process was discovered by Gail's sister-in-law, Mrs. James Borden, who lived on Mustang Creek, near Ganado.

"Did I ever tell you why I've spent 50 years hunting the Twin Sisters?" Charlie asked then.

No, he hadn't.

"Well," he said, those twin cannons arrived at the mouth of the Brazos on the same ship that brought Dr. and Mrs. C. C. Rice to Texas in 1836, along with their nine-year-old twin daughters, Elizabeth and Eleanor.

"In the formal presentation to Capt. Louis Allen of the Texas Army, each little girl sponsored one cannon and made a little patriotic speech. Elizabeth forgot part of her speech, but hardly anybody knew which twin she was. Only way their parents could tell them apart was that Elizabeth was lefthanded."

"How do you know that?" "Elizabeth Rice was my grandmother," said Charley Mitchell.

Nobody ever claimed the \$500 reward. And now Charley has collected his eternal one. Maybe he knows now where the San Jacinto cannons are buried.

—Sigman Byrd

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Editor Terry White
Staff Photographer A. "Pat" Patnesky

Cost Reduction Corner

A computer program has been developed by personnel in the Computation and Analysis Division to produce simulations, in moving picture form, of visual aspects of space flights. The moving pictures are produced by an automatic display device receiving numerical quantities from the computer, displaying these on a cathode ray tube, and taking 35 mm photos of the display. The simulation includes star background (celestial sphere) and the solar system bodies, an orthographic projection of the earth, and configurations of certain spacecraft. By providing position, velocity, and orientation data for one or more spacecraft as a function of time, the program can depict approximately what the astronaut would see in flight. The applications of this program are nearly infinite in number. Such a tool can significantly reduce the manpower required in many applications where data analysis is required. The old saying, "one picture is worth a thousand words" is borne out by this program in a few ways:

1. Analysis of dynamic systems can be viewed in moving picture form to determine if general or specific objectives have been attained. This can be done without tedious analysis of thousands of numbers by several persons, and can be done in much less time.

2. Training films can be developed for such applications as rendezvous and docking, or for viewing a solar eclipse from orbit, or sighting fixed or moving targets on or near some large body like the earth. These films can be produced automatically and rapidly, providing a capability that would require dozens of persons to match even closely through animation.

Savings—3 man-month (estimate). George B. Roush and Gary L. Walker, Computation and Analysis Division, Flight Mechanics Applications Branch.

Space News Of Five Years Ago

October 17 X-15 flown to 108,600 feet and a record speed of 3,900 miles per hour.

October 23—"Freedom 7", the Mercury-Redstone 3 (MR-3) spacecraft, was presented by the NASA to the National Air Museum of the Smithsonian Institution. In making the presentation, NASA Administrator James Webb said: "Such flights as those of Freedom 7 are not stunts. They are not antithetical to sober scientific and technological research. Interpreted properly, these dramatic events can add much to public under-

standing and excite creative interest in extending the base on which public support must rest."

October 25—NASA Headquarters officially approved the Mercury extended range or 1-day mission program.

October 27—Largest known rocket launch to date, the Saturn 1st stage booster, successful on first flight from Cape Kennedy, Fla.

October 27—Comdr. Alan B. Shepard, Jr., was awarded the Theodore Roosevelt Distinguished Service Award in New York City.

Hay Ride and Wiener Slated by Singleton Club

Unattached guys and gals are invited to attend the hayride and wiener roast sponsored by the Space Center 'Singleton' Club on Oct. 22.

The event is scheduled to start at 7 P.M. at the Cloverfield Stables, Friendswood. Tickets are \$1.50 per person.

Additional information may be obtained by calling Brenda Richardson ext 5441.

Here and There Around the Center . . .

CHESTERFIELD JANES, JR., Senior Associated Engineer with IBM was a recent visitor to MSC. JANES recently received N A S A 's Manned Flight Awareness Recognition Award for his work on the Instrument Unit of Saturn 203. He detected gaps in the interface between the structural cone and the I.U. and recommended installation of shims. Engineers report without proper shimming the I.U. would have been damaged during flight. JANES' tour of MSC during Gemini XI was in recognition of his work on the I.U.



JANES

One of the recent recipients of Sustained Performance Awards was MAXIE C. EVANS, Occupational Branch. EVANS received the SSP from Dr. Charles A. Berry, Director of Medical Research and Operations.



EVANS

A University of Houston Coed, Miss JANE RIDER was named Co-Op Student of the Month. Miss RIDER who returned to U of H where she is majoring in Bio-Physics



RIDER

worked in the Space Physiology Branch of the Biomedical Research Office. During her Co-Op work at MSC she performed and analyzed hematology tests.

"Holiday in Las Vegas" Planned Nov. 10-13

"Holiday in Las Vegas", a four day trip to Las Vegas, Nevada is open to MSC employees.

The weekend trip, scheduled for November 10-13, includes roundtrip air fare, transportation to and from Las Vegas airport, and three nights at the fabulous Star Dust Hotel. Cost of the trip is \$110 per person.

Those interested may contact Dick Eastham, ext. 4261.

Winner of the "Dinner for Two" drawing sponsored by the MSC Federal Credit Union last month was Mrs. DOROTHY KUBICEK of the C&SM Project Engineering and Checkout Division. The dinners were donated by Erics.



KUBICEK

Spanish Classes

MSC employees interested in learning Spanish are invited to sign up for the Friday evening classes. Additional information may be obtained by calling Mr. Reyes, at HU 8-1600, ext. 129.

In case you missed the EAA Picnic on October 1 here are some tidbits of the big day: 4,000 cars were parked, 8,426 meals served (including chicken, beef, hot dogs, and gallons of drinks and pound, after pound of cotton candy were consumed. No report on the "bicarb" and liniment.

The "western motif" was carried throughout the park and EAA workers went all out including placing "wanted" posters of top management on trees.



Space News ROUNDUP!

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

EMPLOYEE NEWS

MSC's Regelbrugge Competes In Texas Open Golf Tourney

Beltin' Bobby Regelbrugge Tuesday shot a hole-in-one on

Arts Group Offers Night Art Classes

Art classes in landscape, portrait and drawing/design will be offered starting October 25 by the Houston Contemporary Arts Association. The Tuesday night classes will run from 7 to 9 pm in the Webster Civic Center.

A watercolor class has been proposed, but a minimum of eight students is required to justify holding the class.

Instructors for the classes are Evie Stebbins at 877-4245 and Ruth Lee at 877-1203.

the 195-yard par-3 seventh hole at Ellington AFB golf course. He finished the nine-hole par-36 course with a four-under 32. On the round with him were Capt. Paul Begansky, Lt. Col. John J. Yusiewicz and Bob Johnson.

Regelbrugge, an employee of the Rendezvous Analysis Branch of the Mission Planning and Analysis Division, is a member of the Houston Amateur Golf Association and is known throughout the Houston area as one of the region's finest amateur golfers.

Regelbrugge competed this week in the invitational Texas Open Golf Tournament in Sharpstown.



TSD ALL STARS—Winners of the American Division Slow Pitch Division was the Technical Service Division "All Stars." Shown here with their trophies are members of the "ALL Stars" 1st Row—B. Ball (mgr), J. Axley, B. Shropshire; 2d Row—R. Muniz, R. Ramirez, J. Elliott; 3rd Row—D. Mullins, J. Lee, and Joe Siegfried. Members of the team not in the photo are: Gary Laukon, Danny Welch, Jerry Allen, Mike Schmitt, Bill Pittman, Eddie Willis, Scott Rutherford.

Roundup Swap-Shop

(Deadline for classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested. Use name and home telephone number.)

FOR SALE—HOUSES

Four Bedroom, 1 1/2 sty brick house, 2650 sq ft living area, Imperial Estates, Friendswood, \$28,000-5 3/4% loan to be assumed. HU 2-7969 after 5 P.M.

Three bdrm, 2 bath, all brick home on lrg naturally wooded lot in El Lago Estates, 314 Lake Shore Drive; den built-ins and fireplace; low down payment. Call John Stanley 877-2998 for information.

Friendswood, Imperial Gardens, 1/2 acre corner lot, custom designed contemporary home, 2130 sq ft., 3 bdrms, 2 baths, family room, LR, DR, kitchen, breakfast, study, utility, large patio, 9 ft. full fireplace, 6 mos. old, 6% loan. John Tollison, HU 2-1014.

Sagemont—Colonial Style 3 bdrms., 2 baths, panelled family room, complete built-in kitchen, for equity. Thieroff HU 7-2890.

FOR SALE—AUTOS

1964 Chevrolet Impala super sport, all super sport equipment including bucket seats, Daytona blue w/light blue interior, 327-hp engine, power glide, power steering and power brakes, tilt steering wheel, factory air, tinted glass, AM-FM radio. W. G. Pratt, Kemah 877-2954.

1960 Chevy Impala, one family car, right front fender dented, excellent condition, \$550 John Tollison, HU 2-1014.

1962 Chevy Impala, 2 dr htrp, autotrans, pwr steering, A/C, radio, tinted glass, good tires, white w/red interior, excellent condition, call MI 5-6400 after 5:30 P.M. Sandy Myers.

1963 Buick Riviera, Silver Cloud, \$1700, GR 7-1764, R. D. Nickerson.

1963 Volkswagen, sunroof, red w/white leatherette interior, WSW tires, looks very good, runs perfect, \$900, Rbt Stanley, HU 4-6788.

1963 Volkswagen, w/sunroof, low mileage, excellent condition, \$995. Verne L. Meier, 591 3330.

1964 Chevy, Malibu, 4 dr sedn, R&H, auto-trans., Bill Nunnery GR 3-5009.

1964 Ford Fairlane 500 spts cpe, 2898 2V V, bucket seats, console, 4 spd trans, A/C, radio, new tires and battery. Many extras, 36,000 miles, white w/blue interior, \$1600 (will consider trade & cash), Colburn MI 9-6361.

1965 Pontiac GTO htrp, 389 cu. in., 3-2 bbl carb., 3-speed trans., 32,000 miles, \$2,150, Otto Schellberg, HU 4-7994.

1966 Pontiac Ventura, 4 dr., pwr brakes/steering, air, radio with rear speaker, tinted glass, white walls, many extras, excellent condition, Call after 5 P.M. Dorothy Ludwig, League City 932 3906.

1962 Chevy II-300-Autotrans, A/C, power steering, \$800. Dickinson 534-6045.

FOR SALE—MISC.

Complete Mobile Amateur Radio station-NCX-3 transceiver, NCX-D 12v power supply, stainless steel antenna mount and whip, loading coil, and Electro Voice 727 microphone and coil cord. Complete package for \$325. Contact O. Schmidt 534-4242.

Zenith 21 in. TV (B&W), console cabinet, rabbit ears antenna, good condition, \$75 (or make offer); Casco Jumper chair (light beige) like new \$5; Singer Sewing Machine (Portable) all attachments (new) retail value \$379, sell for \$275. Mrs. Wheelwright 877-4887.

Authentic Chinese Sampan imported from Hong Kong, 16 ft. oars to take up the lake, auxi 6 hp Mercury to bring you home again. Waterproof red conestoga cabin, bait wells, fish knockers. Rugged good quality construction. Ideal for hunting season and lazy moonlight cruising, best offer and 8 ft. El Toro sailing pram with trailer \$225. Phone 877-4102.

Lace wedding gown, size 8, \$50. Yeager, GR 7-1354.

Registered one year old toy silver Poodle available for stud, fee or pick of litter. Greene, 591-2305.

Registered half-American Bay Gelding horse, 2 1/2 yrs old, good trained, excellent show prospect or child's horse, has received three 1st places, two Grand Championships-\$500. Also registered, half-Arabian Chestnut yearling colt, excellent show prospect (brother to above horse)-\$350 Sandra Tramuto, Dickinson, Box 546.

Sports car: Lotus 7 spares for many engines: Pair of SU carbs w/Ford-Lotus manifolds and linkage \$35. (Healey, TR, Volvo etc) Cosworth A-111 billet cam \$40. Stock Anglia 105-E gearbox \$35 complete. Jon Farbman WA 6-7192, RI 7-3435.

Brand new Star Fish and trailer, used twice, List \$680 will sacrifice for \$500. Call JA 9-5232 (after 6 P.M.)

WANTED

Manual typewriter in good condition, Dorothy Ludwig, League City 932-3906.

Family atmosphere for 2 yr. old boy while mother works. Hours 8 a.m. to 5 p.m. Call Linda Deans, HU 8-2340 and HU 8-1243 (after 5 P.M.).

Roommate to share two bedroom apartment with working girl. Contact Sandy Myers after 5:30 P.M. MI 5-6400.

Pay rider wants ride from Broadway and Detroit (close to Bwy Apts, 4114 Bdw) to MSC, shift 8 a.m. to 4:30 p.m., starting November 7, Mary Lopez, MI 4-0795.

Car Pool wanted from Sagemont to MSC 7:30 a.m. to 4 p.m. shift, Tex Ward ext 5595.

Car pool or will pay from 2607 Cedar Drive, La Marque to Bldg 419, 7:30 a.m. to 4 p.m., Evelyn Villeneuve WE 5-3878.

MSC BOWLING ROUNDUP

TEAM	WON	LOST
Mimosa Men's League		
Whirlwinds	17	7
Road Runners	16	8
Technics	15	9
Fabricators	14	10
Strikers	13	11
Weightless Wndrs	11 1/2	12 1/2
Agitators	11	13
Real Timers	10	14
Foul Five	10	14
Chizzlers	8 1/2	15 1/2
Hustlers	8	16

(Standings as of Oct. 6, 1966)

MSC Monday Men's League Standings as of Oct. 11

TEAM	WON	LOST
Humbugs	16	4
Rompers	11	9
Alley Cats	11	9
The Wheels	10	10
Hi Hopes	6	14
Toos	6	14

High game: G. Keith 215, B. Marlow 210.

High Team Game: Toos and Humbugs, tied at 858.

High series: B. Marlowe 588, Cal Mitchell 581.

High team series: Humbugs 2457, Toos 2355.

President's Mission Safety 70 Program

Intersections: Even if you've got a green, Look out for the light-jumpers.

Liebhart Wins TV

Paul Liebhart, Procurement Division, was the lucky winner in the MSC Federal Credit Union's September 30 drawing for a television set.

Toastmasters, Toastmistresses Hold Joint Communications Meet

The MSC Toastmasters Club and the Ellington Toastmistress Club Wednesday will hold a joint public relations meeting at 7 pm at the King's Inn.

Bridge League Forms

Bridge teams representing Houston-area firms are being formed into an Industrial Bridge League for competitive play about once each three weeks. Teams members are limited to paid employees of a company, their spouses or children.

Trophies will be awarded to the winning team. For registering a team in the League, call Bill DeGeorge at HU 4-6480.

Aimed toward realizing the potentials of communication, the meeting's main theme will be "Talking: The Key to You." On the program are table topics by Olive Apple and Toastmaster Alan Doyle, and speakers are Alena Justice, Mildred Rogers, William Der Bing and Maj. Rowe Holmes.

All interested MSC employees are invited to attend. For further information, call Virginia Thompson at 3371.

1966 MSC/EAFB Flag Football League

Standings as of Oct. 6

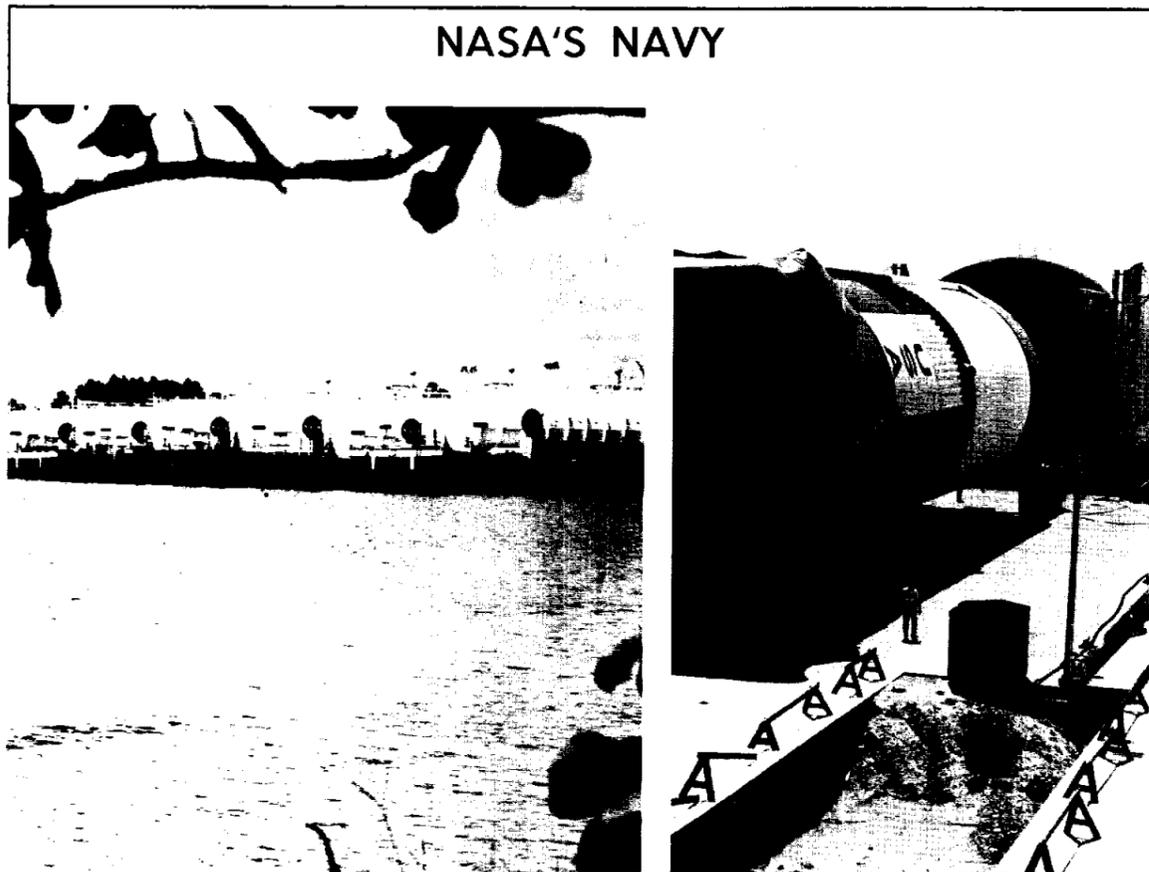
AMERICAN DIVISION		NATIONAL DIVISION	
TEAM (Nbr)	WON LOST	TEAM (Nbr)	WON LOST
Cad (2)*	2 0	IBM (17)	2 0
MPAD-G&P (3)	2 0	Philco/WDL (20)	2 0
IESD (5)	1 0	USCG (21)	1 0
P&PD (1)	1 0	P&PD (15)	1 1
FSD (4)	1 1	TRW (19)	1 1
Lockheed (6)	1 1	FCD (14)	1 1
Grumman (9)	0 1	SMD (13)	1 1
ANG (10)	0 2	SSD (12)	0 2
Link (7)	0 2	MPAD/FSD (16)	0 1
Philco (8)	0 2	NAA (18)	0 2
2578th (11)	0 0	747th (22)	0 0

*-Scored record 53 points against Philco on Oct. 5.

Game Schedule

Date	Team/Time	Date	Team/Time
Oct. 24	3- 1/6 P.M.	Oct. 17	18-16/6 P.M.
	14-12/8 P.M.		7- 5/8 P.M.
Oct. 25	4- 1/6 P.M.	Oct. 18	19-15/6 P.M.
	15-22/8 P.M.		8- 4/8 P.M.
Oct. 26	5-10/6 P.M.	Oct. 19	20-14/6 P.M.
	16-21/8 P.M.		9- 3/8 P.M.
Oct. 27	6- 9/6 P.M.	Oct. 20	21-13/6 P.M.
	17-20/8 P.M.		10- 2/8 P.M.
Oct. 28	18-19/6 P.M.	Oct. 21	22-12/6 P.M.
	7- 8/8 P.M.		11- 1/8 P.M.

NASA'S NAVY



WATERWAYS—Six of nine barges which haul liquid oxygen to Mississippi Test Facility, are shown here at Bay St. Louis, Mississippi (left). The super-cold rocket propellant is hauled through a canal system to the test stands where it is stored in tanks as shown in right. The NASA barge Poseidon (right) is shown as the first flight version of the Saturn V first stage is loaded aboard at New Orleans, La. The first stage was shipped from the Michoud Assembly Facility to the Marshall Space Flight Center at Huntsville, Ala.



SECOND FRONT PAGE

Three Receive Patent On New Rocket Engine

An employee of the NASA-Marshall Space Flight Center and two former employees have been awarded a patent for the design of a revolutionary rocket reaction engine called a "detonation power engine."

The three are: Richard J. Stein, Contracts Office, Industrial Operations; Dr. Oswald H. Lange, now of the Army Missile Command; and Harold E. Tubbs, now teaching school in Panama City, Fla.

The patent counsel at MSFC said that the three retain title to the patent but that the U.S. Government has license to use the invention. The three patent holders retain commercial rights.

An engine of this design would have tremendous power for its size. Ten inches in diameter and less than three feet long, the engine should have a thrust of about one million pounds, judging by results of investigations to date.

According to Stein, the basic idea at the beginning was to produce an engine with high pressure and high temperature ratings which would have no detrimental effect on any exterior hardware.

This is to be accomplished by creating a shock wave by means of "condensed detonation." An igniter sets off a detonation that produces a shock wave that is

directed into the condensed detonation portion of the engine. This shock wave sets off a second condensed detonation reaction which produces high temperature and pressure within millionths of a second.

The engine could not be used for launch purposes because the shock wave would damage the launch pad, Stein said, but it could be used for propulsion in space.

The device could also be used in places where shock waves are desirable, such as in mining operations or excavation.

President's Mission Safety 70 Program

Tailgating: Tailgating is a good way, To lose face — on the dashboard.

Maj. Gen. Stevenson Named Special Assistant to Mueller

Maj. Gen. John D. Stevenson has been appointed Special Assistant to the Dr. George E. Mueller, Associate Administrator for Manned Space Flight.

Maj. Gen. Stevenson's appointment was announced on October 3. He has served as Commander, Central Air De-

Haise Receives Test Pilot Award

Astronaut Fred W. Haise, Jr. was the recipient of the Ray E. Tenhoff Award at the 10th Annual Symposium of the Society of Experimental Test Pilots. The award is given annually for the outstanding technical paper delivered and was presented at the S.E.T.P. Awards Banquet on September 24 in Los Angeles.

The winning paper was titled, "A Quantitative/Qualitative Handling Qualities Evaluation of Seven General Aviation Aircraft."

Grants, Contracts Go To Three Texas Institutions

Three Texas institutions of higher learning are among the 23 national organizations which have received research grants and contracts from the NASA this year.

The NASA grants and contracts totalling \$2.3 million went to 23 universities, colleges and private research institutions throughout the nation.

Receiving grants and contracts in Texas were:

University of Houston, \$11,237; Graduate Research Center of Southwest, Dallas, \$66,454 and the Southwest Research Institute of San Antonio, \$104,850.

fense Force; Commander, Western Air Defense Force; and Assistant Chief of Staff for Operations at SHAPE. Before joining NASA his final Air Force Assignment was that of Commander, Joint Task Force Eight of the Defense Atomic Support Agency.

Mail Must Get Thru — and Does!

If you want things to ZIP around the center its up to you.

So state the people who handle the more than 3-million letters, packages, and communications which pass into, around and out of the center during a year's time.

"Things would much easier and quicker for all concerned," a member of MSC's mail room said, "if people at the center would use the proper mail code."

Although most will agree MSC mailmen don't hotrod up and down the corridors pushing their overloaded carts, they perform their duties with dispatch and efficiency. There are more than 300 drop-off and pickup points throughout the center.

Workload and the limited manpower dictates which routes receive priority. Building 2, top management headquarters, receives eight deliveries daily, starting at 8:30 a.m. each work day.

"Our biggest problem," said Bill Nunnery Chief of the Mail and Records Section of the Mail and Records Management Branch, "is sorting out and delivering inter-center mail which is not coded properly."

Mail handling personnel on the second floor sort and distribute upwards of 11,500 letters or parcels each eight hour day. Those improperly addressed are placed aside until the rush slackens and workers have a moment to identify "Aloysius Jones" as being Code BA, rather than Room 286, Building 31.

Outside of those in the Building 2 second floor mailroom, few people realize the workload under which the MSC mail carriers operate. For example, Nunnery explained, Route 4, one of the 10 separate routes at MSC, includes 10 different buildings.

On an average day the mailman may push, pull, lift and generally just haul around approximately 1,000 lbs of mail. Nunnery said that in addition to sorting out their routes each mail messenger must load the mail cart, take it down to his

panel truck, load it on the truck, drive the truck to each building, unload the mail cart, push it around to each stop, reload the cart and then onto the next stop. On some routes the men repeat this procedure several times a day.

Inter-center mail is the biggest item in the mail and represents nearly 50-percent of the workload, Nunnery said. In September the mailsection handled 7,458 packages, 63,404 incoming and out-going letters and 112,090 inter-center pieces of communication.

Management people would also like to call attention to the NASA Headquarters Instruction requiring that ZIP Codes be used on all outgoing correspondence. To implement this instruction Nunnery said ZIP manuals are available through the submission of MSC Form 614. Workers may also call the Mail Room to obtain ZIP Codes.

Like its big brother the U.S. Post Office, the MSC mailroom too has its seasons, according to Nunnery. Immediately after flights, he explained, the mail volume picks up and when school starts the mail room is flooded with letters from space-knowledge seeking students.

NASA Annual Award Ceremony Held in Washington

Four of the nation's early leaders in space exploration were among a group of 31 persons and five technical teams honored last Friday, when the National Aeronautics and Space Administration presented awards for outstanding contributions to the nation's space program.

The awards were presented by NASA Administrator James E. Webb; Deputy Administrator Dr. Robert C. Seamans, Jr.; and Willis H. Shapley, Associate Deputy Administrator. The ceremony was held in the Department of Health, Education and Welfare Auditorium, in Washington, D.C.

The four men were recognized for their work in pioneering the advancement of space science.

Recipients of the awards were:

Dr. Lloyd V. Berkner, Chairman, Board of Trustees, Graduate Research Center of the Southwest, Dr. Berkner, internationally known scientist, educator and pioneer in space research. He received the NASA Distinguished Public Service Medal;

Dr. Hugh L. Dryden, NASA's first Deputy Administrator, who served until his death last December, received the NASA Distinguished Service Medal posthumously. The award was accepted by Mrs. Dryden;

Dr. T. Keith Glennan, first Administrator of NASA; and General Bernard A. Schriever, USAF (ret.), former Commander of the Air Force Systems Command, were presented the Distinguished Service Medal.

Test Drop At White Sands

An air drop to test a new type of reefing cutter was termed successful last week at the White Sands Missile Range in New Mexico.

The test drop conducted by engineers from the Manned Spacecraft Center involved a Gemini boilerplate equipped with a Mercury parachute. The chute used in the test utilized special suspension lines containing wire to control electrically reefing cutters. Two cutters were used in the test and a test timer inside boilerplate test vehicle was used to send the electrical impulse to activate the cutters.

Engineers say this electrically controlled reefing can be used to synchronize disreefing of a cluster of parachutes.